

Claims

[c1] What is claimed is:

1. A method for controlling an operating temperature of a video graphics array (VGA) chipset, the method comprising:

monitoring a rotational speed of a cooling fan installed on the VGA chipset, the rotational speed of the cooling fan being controlled by a fan power;

monitoring a vital temperature of a graphics processor of the VGA chipset;

increasing the fan power when the vital temperature is substantially above a first threshold to increase the fan speed;

decreasing the fan power when the vital temperature is substantially below the first threshold to decrease the fan speed;

increasing the operating clock speed of the processor when the vital temperature is substantially below a second threshold; and

decreasing the operating clock speed of the processor when the vital temperature is substantially above the second threshold.

- [c2] 2. The method of claim 1 further comprising:
maintaining the fan power when the vital temperature is substantially equal to the first threshold to maintain the fan speed; and
maintaining the operating clock speed when the vital temperature is substantially equal to the second threshold.
- [c3] 3. The method of claim 1 further comprising:
increasing an operating voltage of the processor when the vital temperature is substantially below a third threshold; and
decreasing an operating voltage of the processor when the vital temperature is substantially above the third threshold.
- [c4] 4. The method of claim 1 wherein the vital temperature is obtained from an on-die thermal monitoring transistor of the processor.
- [c5] 5. The method of claim 1 wherein increasing and decreasing the fan power and operating clock speed are controlled by relations stored in a random access memory or hard disk electrically connected to the VGA chipset.
- [c6] 6. The method of claim 1 wherein the first and second

thresholds are equal.

[c7] 7. A method for controlling an operating temperature of a video graphics array (VGA) chipset, the method comprising:

monitoring a rotational speed of a cooling fan installed on the VGA chipset, the rotational speed of the cooling fan being controlled by a fan power;

monitoring a vital temperature a graphics processor of the VGA chipset;

increasing the fan power when the vital temperature is substantially above a first threshold to increase the fan speed;

decreasing the fan power when the vital temperature is substantially below the first threshold to decrease the fan speed;

increasing the operating voltage of the processor when the vital temperature is substantially below a third threshold; and

decreasing the operating voltage of the processor when the vital temperature is substantially above the third threshold.

[c8] 8. The method of claim 7 further comprising:

maintaining the fan power when the vital temperature is substantially equal to the first threshold to maintain the fan speed; and

maintaining the operating voltage when the vital temperature is substantially equal to the third threshold.

- [c9] 9. The method of claim 7 further comprising:
increasing the operating clock speed of the processor when the vital temperature is substantially below a second threshold; and
decreasing an operating clock speed of the processor when the vital temperature is substantially above the second threshold.
- [c10] 10. The method of claim 7 wherein the vital temperature is obtained from an on-die thermal monitoring transistor of the processor.
- [c11] 11. The method of claim 7 wherein increasing and decreasing the fan power and operating voltage are controlled by relations stored in a random access memory or hard disk electrically connected to the VGA chipset.
- [c12] 12. The method of claim 7 wherein the first and third thresholds are equal.
- [c13] 13. A video graphics array (VGA) chipset with cooling system comprising:
a graphics processor having an operating power controlled by an operating power control signal;
a cooling fan for cooling the graphics processor;

a fan input-output module electrically connected to the fan for transmitting a fan control signal to the fan, the fan control signal controlling the rotational speed of the fan;

a controller electrically connected to the fan input-output module and the graphics processor, the controller comprising fan logic for generating the fan control signal based on a vital temperature of the graphics processor and outputting the fan control signal to the fan input-output module, and power logic for generating the operating power control signal based on the vital temperature of the graphics processor and outputting the operating power control signal to the graphics processor; and a temperature transducer connected to the graphics processor for measuring the vital temperature and outputting the vital temperature to the controller.

[c14] 14. The cooling system of claim 13 wherein the graphics processor comprises a clock speed circuit electrically connected to the controller for receiving the operating power control signal, the graphics processor adjusting an operating clock speed according to input to the clock speed circuit.

[c15] 15. The cooling system of claim 14 further comprising a memory electrically connected to the controller for storing at least a relation relating the operating clock speed

of the graphics processor to the vital temperature.

- [c16] 16. The cooling system of claim 13 wherein the graphics processor comprises a voltage circuit electrically connected to the controller for receiving the operating power control signal, the graphics processor adjusting an operating voltage according to input at the voltage circuit.
- [c17] 17. The cooling system of claim 16 further comprising a memory electrically connected to the controller for storing at least a relation relating the operating voltage of the graphics processor to the vital temperature.
- [c18] 18. The cooling system of claim 13 further comprising a memory electrically connected to the controller for storing at least a relation relating the fan control signal to the vital temperature.
- [c19] 19. The cooling system of claim 13 wherein the temperature transducer is an on-die thermal monitoring transistor of the graphics processor.
- [c20] 20. The cooling system of claim 13 further comprising a user interface electrically connected to the controller, the user interface comprising a display device and an input device for receiving control parameters from an external source; wherein the controller references the control pa-

rameters to generate the fan control signal and the operating power control signal.